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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/790,716	03/03/2004	Masayoshi Takahashi	Q79574	2616
23373	7590	09/21/2006		
SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037				
			EXAMINER DOUGLAS, JOHN CHRISTOPHER	
			ART UNIT 1764	PAPER NUMBER

DATE MAILED: 09/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/790,716

Applicant(s)

TAKAHASHI ET AL.

Examiner

John C. Douglas

Art Unit

1764

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) 10-17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) 1-18 are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                                            |                                                                                         |
|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____                                                |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election without traverse of Group I claims 1-9 and 18 in the reply filed on 6/19/2006 is acknowledged.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:  
  
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
3. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claims do not specifically indicate what gas is used to make the ultrafine bubbles.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:  
  
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

Art Unit: 1764

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1, 4-6, 8, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holloway (US 6521248).

8. With respect to claims 1, 4, and 18, Holloway discloses a method of making a micro-cluster water (a hydrate, see Holloway, column 6, lines 27-30) by subjecting water to cavitation such that dissolved entrained gases in the water form a plurality of bubbles and reducing the pressure of the liquid to cause the bubbles to implode (see Holloway, claims 1, 3, and 10).

9. With respect to claim 5, Holloway discloses where the bubbles are generated by subjecting water to a first pressure between about 55 psig and about 120 psig followed by a rapid depressurization to a second pressure at about 1atm (see Holloway, claims 6 and 8).

10. With respect to claim 6, Holloway discloses that the gas is dissolved into water at larger quantities due to increased partial pressure (see Holloway, column 5, lines 52-59).

11. With respect to claim 8, Holloway discloses that the bubbles are generated by pressurizing the water into a rotational volute to create a vortex that reaches partial vacuum pressures releasing entrained gases as bubbles (see Holloway, column 5, lines 25-29).

12. Claims 2, 3, 7, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holloway in view of JP 2000-000447.

13. With respect to claim 2, Holloway discloses everything in claim 1 (see paragraph 8), but does not disclose where the bubbles have a diameter of less than 50 micrometers.

However, JP discloses generating bubbles having diameters of 20 micrometers (see JP, paragraph 3).

JP discloses that bubbles having diameters of 20 micrometers allow for efficient dissolving of gases into the water (see JP, paragraph 2).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Holloway to include generating bubbles having diameters of 20 micrometers in order to allow for efficient dissolving of gases into the water.

14. With respect to claim 3, Applicant discloses that bubbles having a diameter of 1mm ascend at a rate of 100 mm/ sec or more and bubbles having a diameter of 50

micrometers ascend at a rate of 1 mm/sec or less (see Specification, paragraph 30). JP discloses bubbles with a diameter of 20 micrometers. Therefore, the bubbles of JP would ascend at a rate less than 1 mm/sec.

15. With respect to claim 7, Applicant discloses that the collapsing of the ultrafine bubbles would cause the gas hydrate to be formed at a region above the metastable marginal curve (see Specification, paragraphs 26-27). Collapsing of ultrafine bubbles is taught by Holloway in view of JP (see paragraphs 8 and 13). Therefore, the gas hydrate to be formed at a region above the metastable marginal curve would be a necessary result from the prior art.

16. With respect to claim 9, JP discloses where the ultrafine bubbles are generated by a cylinder with a diameter that becomes gradually smaller such as a wine bottle configuration, which would be similar to Applicant's bell configuration in Figure 1 (see JP, paragraph 14).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John C. Douglas whose telephone number is 571-272-1087. The examiner can normally be reached on 7:30 A.M. to 4:30 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1764

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JCD

9/8/06



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